

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-16 (Cancelled).

Claim 17 (Previously Presented): A transmitting device for transmitting signals in a wireless orthogonal frequency division multiplex (OFDM) communication system with multiple transmission antennas, comprising:

first and a second antenna means for transmitting data of a first and said second data stream, respectively, in OFDM signals; and

pilot symbol generating means for generating first and second pilot symbols to be transmitted among said data of said first and second data stream, wherein first pilot symbols are transmitted via said first antenna and second pilot symbols are transmitted via said second antenna,

wherein said first and second pilot symbols correspond to one another and have the same frequency and time allocation and a regular distribution in the time and frequency dimension in the OFDM system,

and wherein pairs of first pilot symbols adjacent in the frequency dimension are respectively orthogonal to corresponding pairs of second pilot symbols and pairs of first pilot symbols adjacent in the time dimension are respectively orthogonal to the corresponding pairs of second pilot symbols.

Claim 18 (Previously Presented): A transmitting device according to claim 17, wherein corresponding first and second pilot symbols having the same frequency and time allocation are alternatingly identical and orthogonal to each other in the frequency and time dimension.

Claim 19 (Previously Presented): A receiving device for receiving signals in a wireless orthogonal frequency division multiplex (OFDM) communication system with multiple transmission antennas, comprising:

a single antenna means for receiving signals transmitted from a first and a second antenna means of a transmitting device of the OFDM communication system, said first and said second antenna means transmitting corresponding first and second pilot symbols respectively,

wherein said first and second pilot symbols correspond to one another and have the same frequency and time allocation and a regular distribution in the time and frequency dimension in the OFDM system, and wherein pairs of first pilot symbols adjacent in the frequency dimension are respectively orthogonal to the corresponding pairs of second pilot symbols and pairs of first pilot symbols adjacent in the time dimension are respectively orthogonal to the corresponding pairs of second pilot symbols; and

processing means for detecting pilot symbols in the received signals, for processing detected pilot symbols and performing a channel estimation on the basis of said processing to separately determine the transmission quality of signals transmitted from each of said first and said second antenna means.

Claim 20 (Previously Presented): A receiving device according to claim 19, wherein said first and second pilot symbols transmitted from said first and second antenna means are alternatingly identical and orthogonal to each other in the frequency and time dimension, and adjacent pairs of pilot symbols are processed to determine the transmission quality.

Claim 21 (Previously Presented): A channel estimation method for performing a channel estimation in a wireless orthogonal frequency division multiplex (OFDM) communication system in which a transmitting device comprising a first and a second antenna transmits signals, comprising the steps of:

transmitting first and second pilot symbols via said first and said second antenna means, respectively, wherein said first and second pilot symbols correspond to one another and have the same frequency and time allocation and a regular distribution in the time and frequency dimension in the OFDM communication system,

and wherein pairs of first pilot symbols adjacent in the frequency dimension are respectively orthogonal to corresponding pairs of second pilot symbols and the pairs of first pilot symbols adjacent in the time dimension are respectively orthogonal to the corresponding pairs of second pilot symbols;

receiving said pilot symbols in a single antenna of a receiving device; and

processing said received pilot symbols and performing a channel estimation on the basis of said processing to separately determine the transmission quality of said signals transmitted from said first and said second antenna means.

Claim 22 (Previously Presented): A channel estimation method according to claim 21,

wherein said first and second pilot symbols transmitted from said first and second antenna means are alternately identical and orthogonal to each other in the frequency and time dimension, and adjacent pairs of pilot symbols are processed to determine the transmission quality.

Claim 23 (Previously Presented): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system having a plurality of transmission antennas; the device comprising;

symbol generating means for generating said data symbols and said pilot symbols, means for transmitting said data symbols and pilot symbols respectively by using a plurality of subcarriers of said OFDM transmission system via said plurality of transmission antennas,

wherein said symbol generating means generates a first type pilot symbol and a second type pilot symbol having an inverted value of said first type pilot symbol so that a pilot symbol pattern to be transmitted by using one of said plurality of transmission antennas has a different pattern in the frequency and time dimension from a pilot symbol pattern to be transmitted by using another transmission antenna.

Claim 24 (Previously Presented): A transmitting device according to claim 23,

wherein said first and second type pilot symbols have the same frequency and time allocation and are alternately identical and inverted to each other in the frequency and time dimension.

Claim 25 (Previously Presented): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system having a plurality of transmission antennas; the device comprising:

symbol generating means for generating said data symbols and said pilot symbols;  
and

means for transmitting said data symbols and pilot symbols by using a plurality of subcarriers of said OFDM transmission system via said plurality of transmission antennas,

wherein a pilot symbol pattern, in which a first type pilot symbol and a second type pilot symbol having an inverted value of said first type pilot symbol are regularly allocated in the frequency and time dimension, to be transmitted by using one of said plurality of transmission antennas is different from a pilot symbol pattern to be transmitted by using another transmission antenna.

Claim 26 (Previously Presented): A transmitting device according to claim 25,  
wherein said first and second type pilot symbols have the same frequency and time allocation and are alternately identical and inverted to each other in the frequency and time dimension.

Claim 27 (Previously Presented): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system; the device comprising:

symbol generating means for generating said data symbols and said pilot symbols;  
and

means for transmitting said data symbols and pilot symbols by using a plurality of subcarriers of said OFDM transmission system via a plurality of transmission antennas,

wherein said symbol generating means assigns either a first type pilot symbol or a second type pilot symbol having an inverted value of said first type pilot symbol to said generated pilot symbols in the frequency and time dimension in the different manner for each of said plurality of transmission antennas.

Claim 28 (Previously Presented): A transmitting device according to claim 27, wherein said first and second type pilot symbols have the same frequency and time allocation and are alternatingly identical and inverted to each other in the frequency and time dimension.

Claim 29 (Previously Presented): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system; the device comprising:

symbol generating means for generating said data symbols and said pilot symbols;  
and

means for transmitting said data symbols and pilot symbols by using a plurality of subcarriers of said OFDM transmission system via a plurality of transmission antennas,

wherein said symbol generating means generates a first type pilot symbol and a second type pilot symbol having an inverted value of said first type pilot symbol in the frequency and time dimension.

Claim 30 (Previously Presented): A transmitting device according to claim 29, wherein said first and second type pilot symbols have the same frequency and time allocation and are alternatingly identical and inverted to each other in the frequency and time dimension.

Claim 31 (Previously Presented): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) communication system having a plurality of transmission antennas; the device comprising:  
symbol generating means for generating said data symbols and said pilot symbols, including first and second pilot symbols,

wherein said first pilot symbols and second pilot symbols are of the same type, and wherein some of said first and second pilot symbols ~~in the time as well as in the frequency dimension~~ are identical to each other with respect to time and frequency domains and some of said first and second pilot symbols ~~in the time as well as in the frequency dimension~~ are respectively inverted to each other with respect to time and frequency domains; and

means for transmitting said data symbols and pilot symbols respectively using a plurality of subcarriers and timeslots of said OFDM transmission system,

wherein a first transmission antenna of said plurality of transmission antennas transmits said first pilot symbols and a second transmission antenna of said plurality of transmission antennas transmits said second pilot symbols, and

wherein said first and second pilot symbols are respectively transmitted in the same timeslots and the same subcarriers of the OFDM communication system.

Claim 32 (Currently Amended): A transmitting device according to claim 31, wherein said first and second type pilot symbols are alternatingly identical and inverted to each other in the frequency and time ~~dimension~~ domains.

Claim 33 (Currently Amended): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system having a plurality of transmission antennas; the device comprising:

symbol generating means for generating said data symbols and said pilot symbols;  
and

means for transmitting said data symbols and pilot symbols respectively using a plurality of subcarriers of said OFDM transmission system via said plurality of transmission antennas,

wherein said symbol generating means generates a first type pilot symbol and a second type pilot symbol being orthogonal to said first type pilot symbol so that a pilot symbol pattern transmitted by using one of said plurality of transmission antennas has a different pattern in the frequency and time ~~dimension~~ domains from a pilot symbol pattern to be transmitted by using another transmission antenna.

Claim 34 (Currently Amended): A transmitting device according to claim 33, wherein said first and second type pilot symbols are alternatingly identical and orthogonal to each other in the frequency and time ~~dimension~~ domains.



Claim 35 (Currently Amended): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system having a plurality of transmission antennas; the device comprising:

symbol generating means for generating said data symbols and said pilot symbols;  
and

means for transmitting said data symbols and pilot symbols using a plurality of subcarriers of said OFDM transmission system via said plurality of transmission antennas,

wherein a pilot symbol pattern, in which a first type pilot symbol and a second type pilot symbol orthogonal to said first type pilot symbol are regularly allocated in [[the]] frequency and time ~~dimension~~ domains, to be transmitted using one of said plurality of transmission antennas is different from a pilot symbol pattern to be transmitted by using another transmission antenna.

Claim 36 (Currently Amended): A transmitting device according to claim 35,  
wherein said first and second type pilot symbols are alternatingly identical and orthogonal to each other in the frequency and time ~~dimension~~ domains.

Claim 37 (Currently Amended): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system, the device comprising:

symbol generating means for generating said data symbols and said pilot symbols;  
and

means for transmitting said data symbols and pilot symbols by using a plurality of subcarriers of said OFDM transmission system via a plurality of transmission antennas,

wherein said symbol generating means assigns either a first type pilot symbol or a second type pilot symbol being orthogonal to said first type pilot symbol to said generated pilot symbols in [[the]] frequency and time ~~dimension~~ domains in the different manner for each of said plurality of transmission antennas.

Claim 38 (Currently Amended): A transmitting device according to claim 37,  
wherein said first and second type pilot symbols are alternatingly identical and orthogonal to each other in the frequency and time ~~dimension~~ domains.

Claim 39 (Currently Amended): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) transmission system; the device comprising:

symbol generating means for generating said data symbols and said pilot symbols;  
and

means for transmitting said data symbols and pilot symbols by using a plurality of subcarriers of said OFDM transmission system via a plurality of transmission antennas,

wherein said symbol generating means generates a first type pilot symbol and a second type pilot symbol orthogonal to said first type pilot symbol in the frequency and time ~~dimension~~ domains.

Claim 40 (Currently Amended): A transmitting device according to claim 39,  
wherein said first and second type pilot symbols are alternatingly identical and orthogonal to each other in the frequency and time ~~dimension~~ domains.

Claim 41 (Currently Amended): A transmitting device for transmitting data symbols and pilot symbols in an orthogonal frequency division multiplex (OFDM) communication system having a plurality of transmission antennas; the device comprising:

symbol generating means for generating said data symbols and said pilot symbols, wherein said symbol generating means generates first pilot symbols and second pilot symbols,

wherein said first pilot symbols and second pilot symbols are of the same type, and wherein some of said first and second pilot symbols in ~~[[the]]~~ time and frequency ~~dimension~~ domains are identical to each other and some of said first and second pilot symbols in the time and frequency dimension are respectively orthogonal to each other; and

means for transmitting said data symbols and pilot symbols respectively by using a plurality of subcarriers and timeslots of said OFDM transmission system,

wherein a first transmission antenna of said plurality of transmission antennas transmits said first pilot symbols and a second transmission antenna of said plurality of transmission antennas transmits said second pilot symbols, and

wherein said first and second pilot symbols are respectively transmitted in the same timeslots and the same subcarriers of the OFDM communication system~~[[,]]~~.

Claim 42 (Currently Amended): A transmitting device according to claim 41, wherein said first and second type pilot symbols are alternatingly identical and orthogonal to each other in the frequency and time ~~dimension~~ domains.